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Safety Awareness for responders to Emergency Operations: Demolition Safety

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Overview

- Introduction to Demolition Regulations

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Objectives of this training - At the end of this short session, you should be able to:

1. Identify the hazards
2. Explain how to protect yourself from these hazards
3. Increase safety and health awareness

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OSHA Demolition Standards

- 1926.850 Preparatory operations
- 1926.851 Stairs, passageways, ladders
- 1926.852 Chutes
- 1926.853 Floor openings
- 1926.854 Walls, masonry & chimneys
- 1926.855 Manual removal of floors
- 1926.856 Removal of walls, floors w/ equip.
- 1926.857 Storage
- 1926.858 Removal of steel constructio
- 1926.859 Mechanical demolition
- 1926.856 Demolition by explosives

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1926.850 Preparatory Operations

- Engineering survey, competent person, written record
- Framing, floors, walls
- Unplanned collapse
- Worker exposure to adjacent structures

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1926.850 Preparatory Operations

- Damaged structures where employees must enter shall be shored or braced
- Utilities shutoff or capped before starting

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1926.850 Preparatory Operations

- Relocate & protect any needed utilities
- Test or purge pipes containing HazMat

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1926.850 Preparatory Operations

- Remove fragmented glass prior to demolition if a hazard to workers

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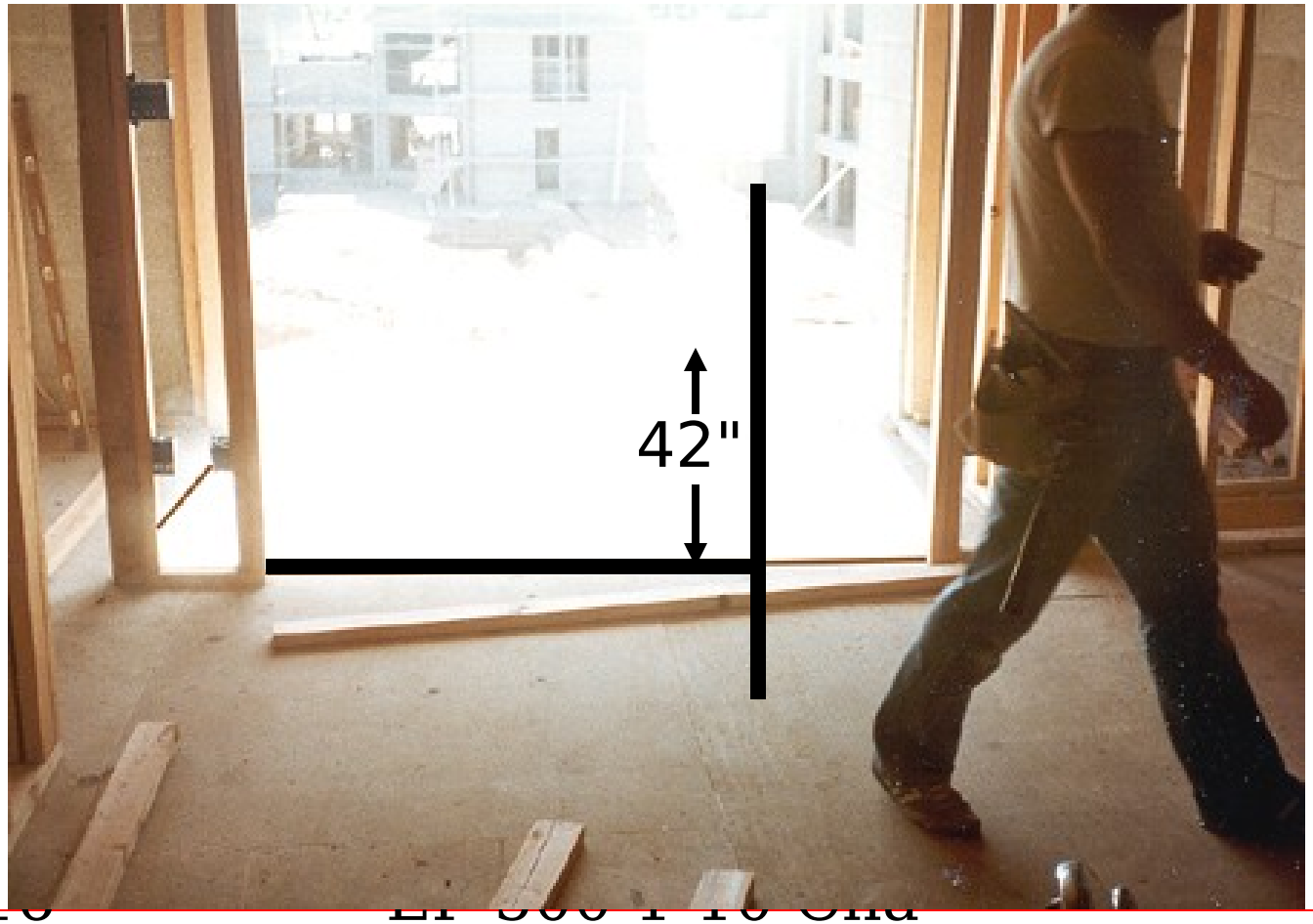
1926.850 Preparatory Operations

- Protect wall openings to height of 42 inches



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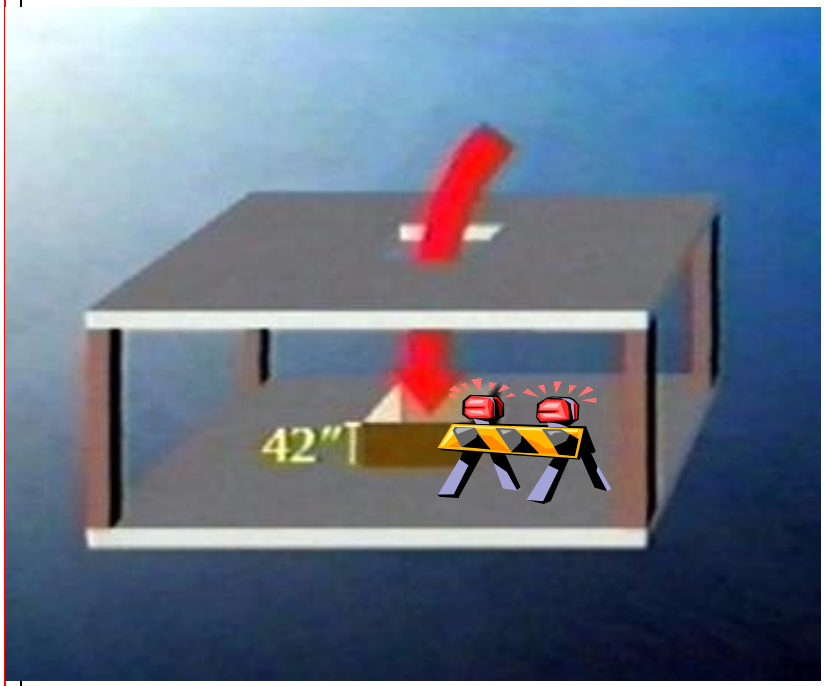
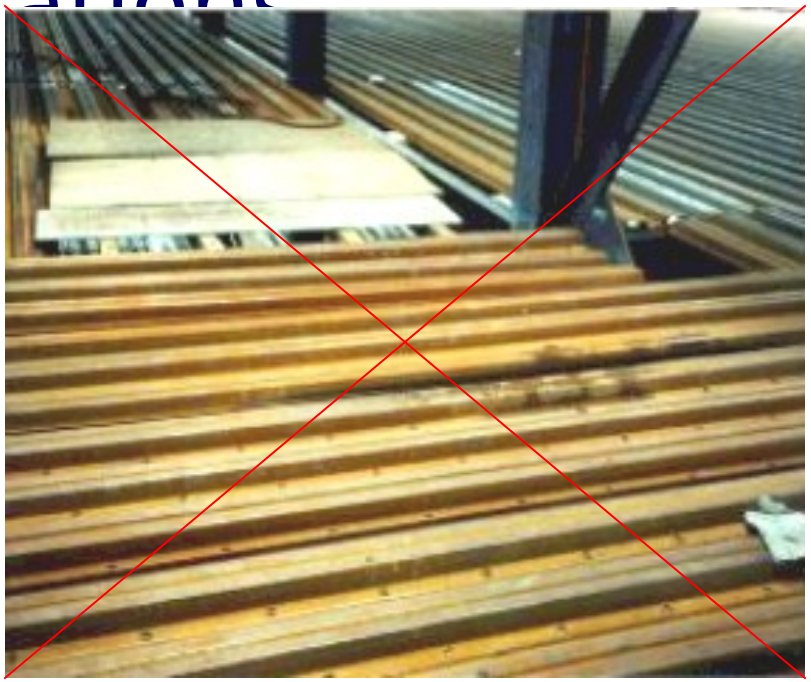
1926.850 Preparatory Operations



- Debris through floor holes - no chute:
  - Barricade six feet back from hole
  - 42 inch guard rail
  - Warning signs each level
  - Cease above operations before removing below

1926.850 Preparatory Operations

- Floor openings not for material drops:
  - Covered
  - Strong enough for any imposed loads
  - Secured



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1926.850 Preparatory Operations

- Except for prep work (cutting holes for chutes, etc..) demolish top down
- Uppermost ext. walls & floors removed to storage prior to removing from floor below

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1926.850 Preparatory Operations

- **Employee entrances - Multi-story structures**
  - **Sidewalk shed or canopy**
  - **8 feet out from building**
  - **2 feet wider than entrance**
- **Sustain a load of 150 pounds per square foot**

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1926.851 Stairs, passageways…

- Only designated stairs used, close all others
- Inspect to ensure all maintained in clean, safe conditions

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1926.851 Stairs, passageways...

- Multistory buildings, stairwells illuminated
- Access through properly lighted, protected, and separate passageway.

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1926.852 Chutes

- No material dropped outside exterior walls unless area is protected
- Material chutes STEEPER than 45 degrees, fully enclosed

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1926.852 Chutes

- Chute opening ≥ 48 inches, with closures
- Substantial gate at discharge, controlled by competent employee

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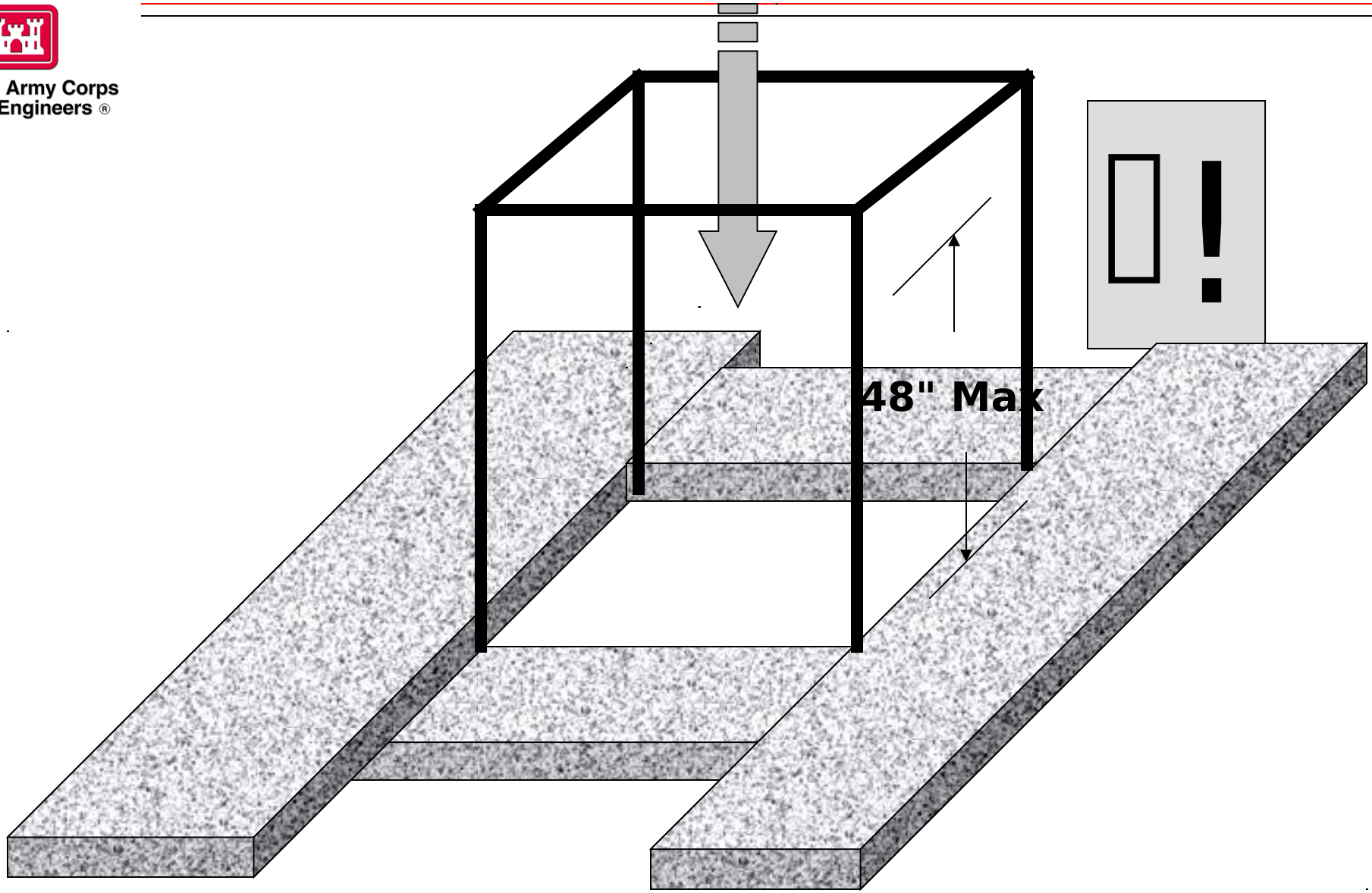

Openings kept closed when not in use

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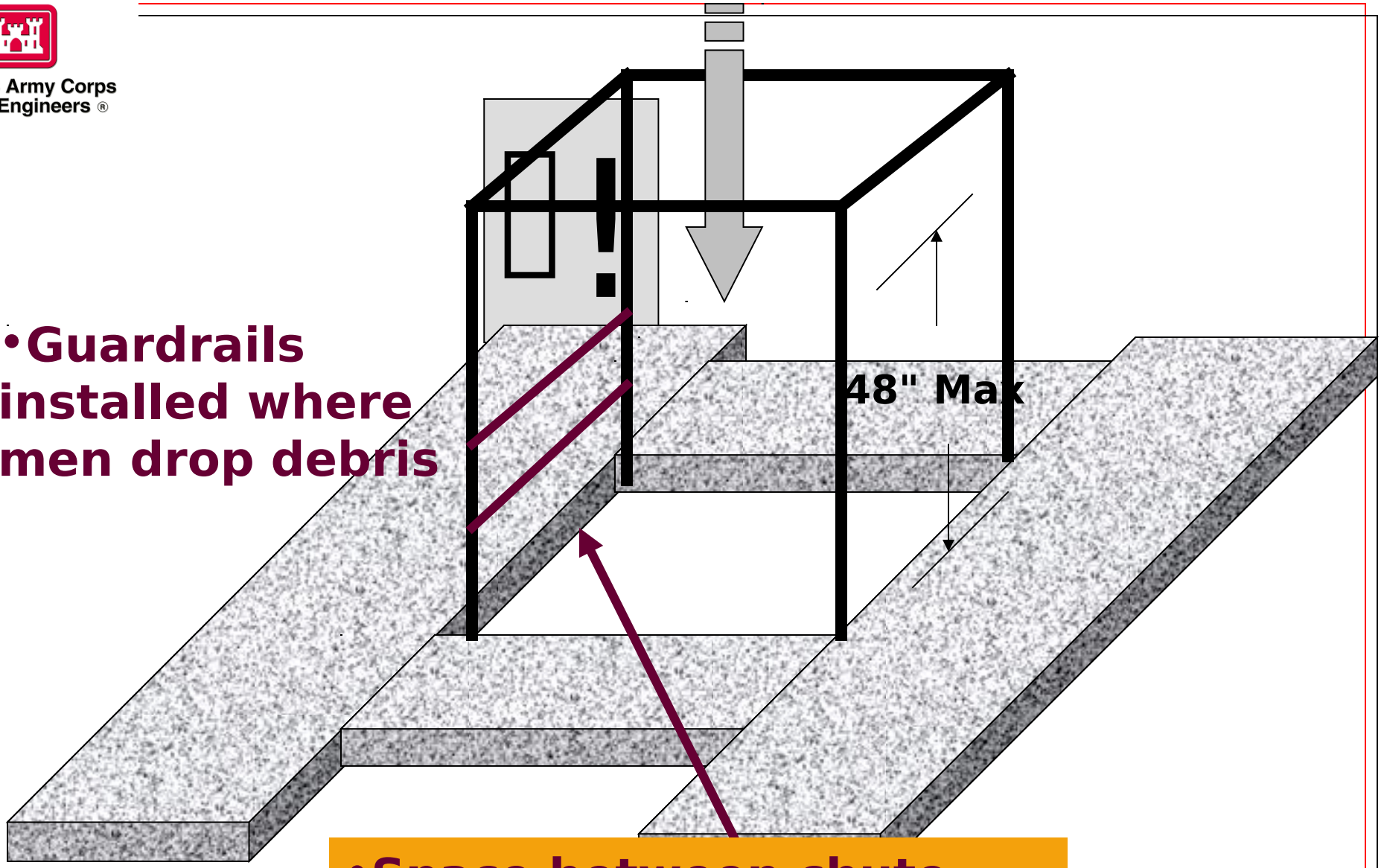
- **Guardrails installed where men drop debris**



- **Space between chute and edge of floor solidly covered**

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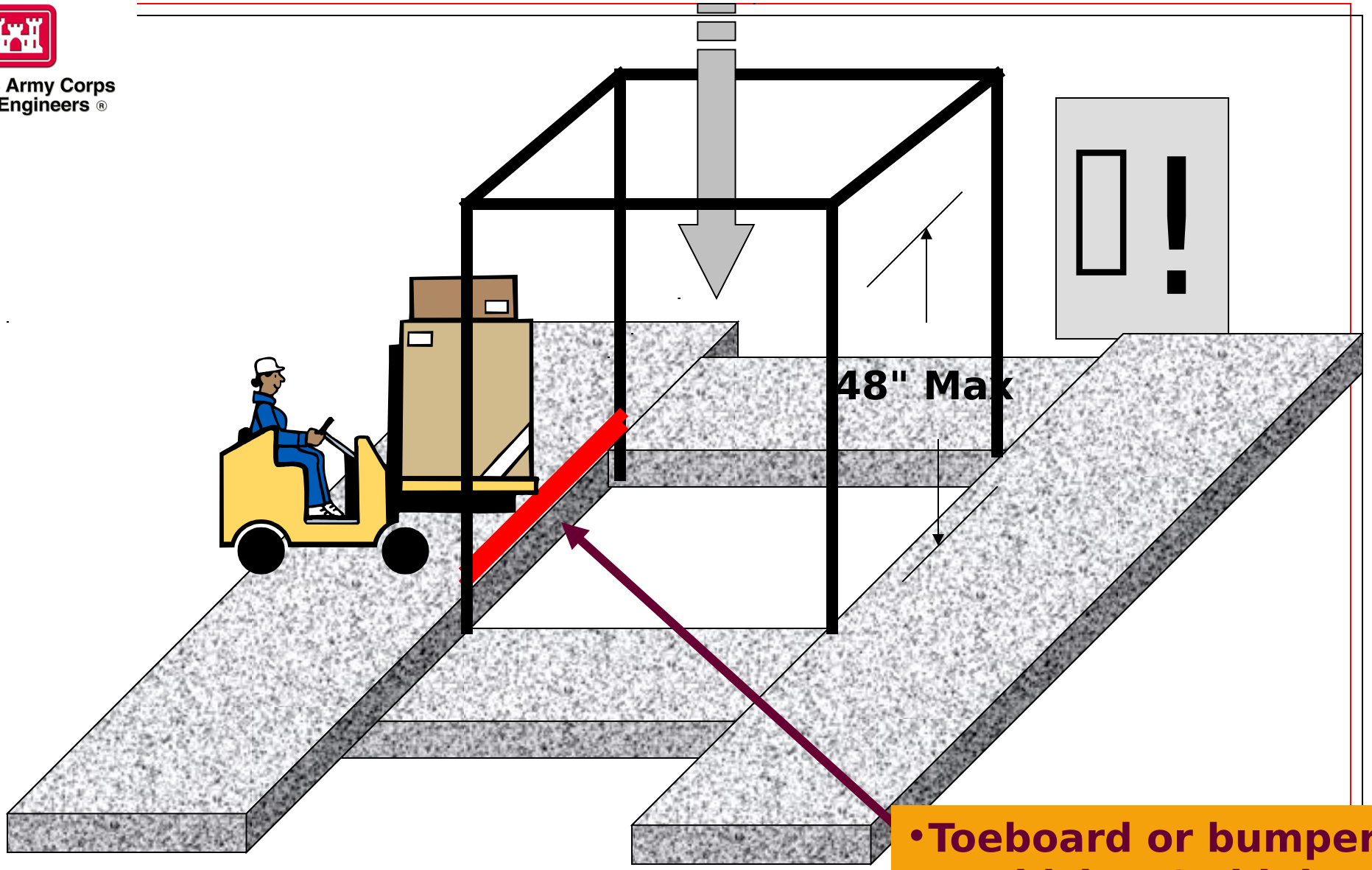

- Toeboard or bumper
- 4” thick X 6” high
- Securely attached

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1926.853 Removal of material through floor openings

- Floor openings no larger than 25% aggregate total floor area, unless lateral supports remain
- Floors weakened or unsafe through demolition must be shored to carry intended loads for demolition

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1926.854 Removal of walls, masonry sections, and chimneys

- Falling masonry sections shall not exceed safe carrying capacities of floors
- No walls higher than one story shall stand alone
- All walls in stable condition at end of shift
- No employees on top of walls if weather is a hazard

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1926.854 Removal of walls, masonry sections, and chimneys

- Load supporting members on any floor shall not be removed until floors above are gone
- Floor openings ≤ 10 feet from any wall to be demolished, fully planked unless no one below
- Skeleton-steel can remain in place as long as loose masonry removed as demolished

Structural or load-supporting members on any floor shall not be cut or removed until all stories above such a floor have been demolished and removed. This provision shall not prohibit the cutting of floor beams for the disposal of materials or for the installation of equipment, provided that the requirements of 1926.853 and 1926.855 are met.

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1926.854 Removal of walls, masonry sections, and chimneys

- Walkways or ladders, to safely reach or leave, scaffolds or walls
- Retaining walls supporting earth or adjoining structures, braced or undrepinned before demolitaion
- Walls used to retain piled debris must safely support imposed load

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1926.855 Manual removal of floors

- Openings cut in floor, extend full span of arch between supports
- remove debris from any floor arch or adjacent area first
- Provide min, full size 2 x 10’s for standing while breaking arches between beams
- 2 x 10’s must support if arch collapses
- 16 inch max between planks

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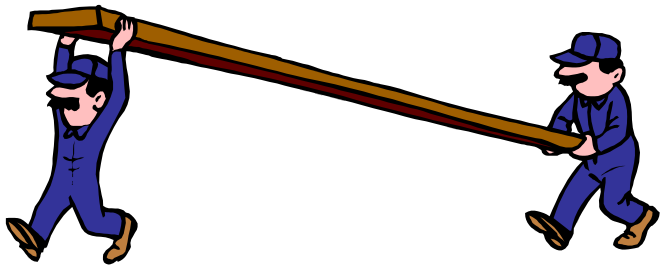
1926.855 Manual removal of floors

- Min 18 x 2 wood walkways or eq. to avoid walking on exposed beams
- Sufficient strength stringers to support planks
- Ends of stringers supported by floor beams or girders not arches alone
- Planks over solid bearing and min 1 ft overlap



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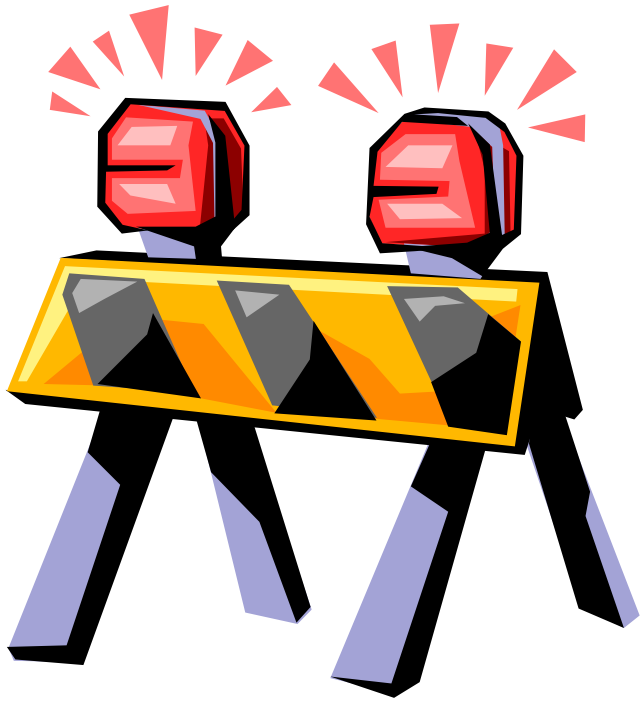
1926.855 Manual removal of floors

- Removing floor arches no employees below and must barricade
- Clear debris within twenty ft. before removing floor arches



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1926.856 Removal of walls, floors, materials and equipment

- **No mechanical equipment on floors unless sufficient strength**
- **Floor openings: curbs or stop logs**
- **Mechanical equipment meets Subparts N and O**
- **(cranes and motor vehicles)**

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1926.857 Storage

- Storage of debris on any floor, within floor load
- Wooden floor building, can remove one floor above grade to store debris
- Do not remove wood floor beams bracing int. or free-standing ext. walls until shored

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1926.857 Storage

- Remove floor arches up to 25 ft above grade to store debris, structure must remain stable
- Block off storage space for dumped material
- Opening only for removal
- Kept closed all other times

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1926.858 Removal of steel construction

- When arches have been removed, planks provided before razing the steel framing
- Cranes, derricks, hoists meet subpart N
- Steel dismantled column length x c. l. & tier by tier (two story columns OK)
- No over-stressing dismembered members

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1926.859 Mechanical Demolition

- No workers in areas adversely affected by balling or clamming operations
- Only necessary workers allowed any other time
- Demolition ball ≤ 50% of craned rated load
- or 25% of breaking strength of line from which it is suspended (whichever is less)

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1926.859 Mechanical Demolition

- Crane boom, load line as short as possible
- Swivel type connection ball & load line
- Positive attachment, no accidental disconnect

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1926.859 Mechanical Demolition

- When pulling over walls all steel members previously cut free
- Remove cornices etc..., before pulling over wall
- During demolition, continuing inspections by competent person, detect & eliminate hazards

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Subpart U

Blasting Explosives

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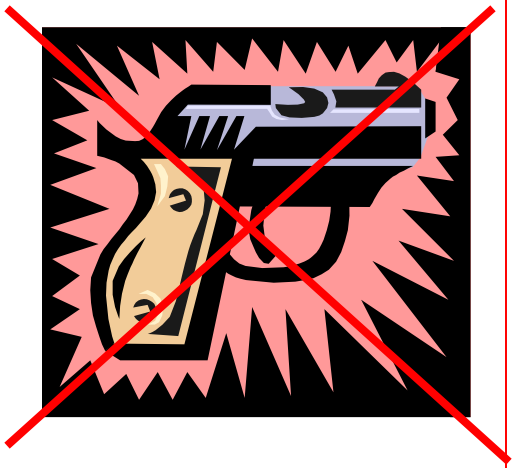
1926.900 General provisions

- Only authorized & qualified handle explosives
- Smoking, firearms, matches, open flames prohibited while explosives are handled, transported or used
- No drugs or alcohol while handling or using
- Account for ***all*** explosives at ***all*** times
- Unused explosives locked in magazine



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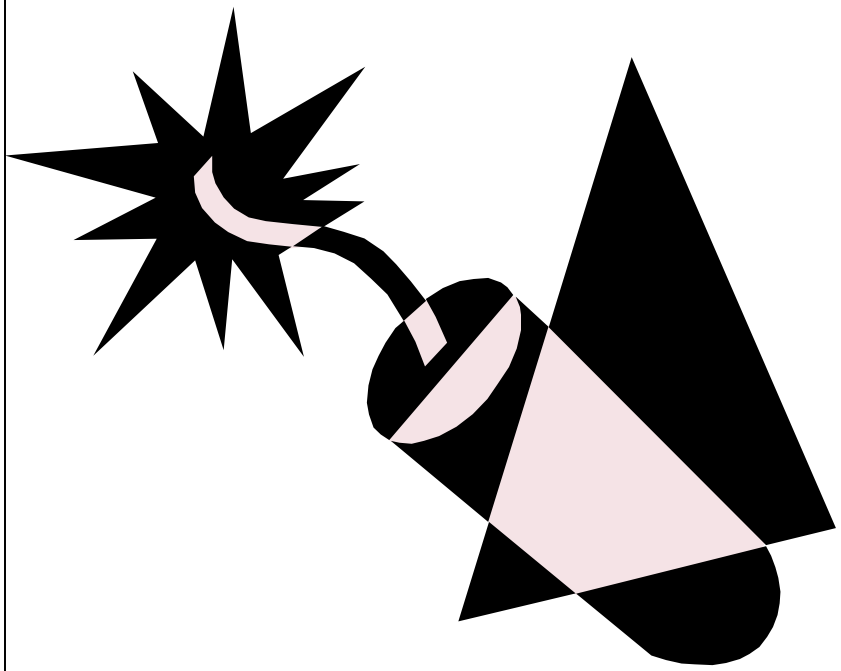
1926.900 General provisions



- Owner keeps record, notifies authority if lost, stolen, unauthorized magazine entry
- Fight no fires near explosives
- If blasting near structures confine throw of fragments w/ mats, protect employees

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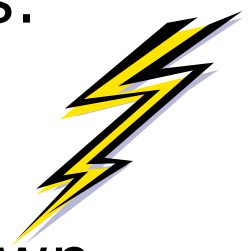
1926.900 General provisions

- Authorized employees must use precautions: visible & audible warning signals, flags, barricades etc... to ensure employee safety
- Conduct blasting between sunup and sundown
- Due precautions prevent accidental discharge of electric blasting caps: radar, lightning, radio transmitters, powerlines, dust storms & any other extraneous source of electricity



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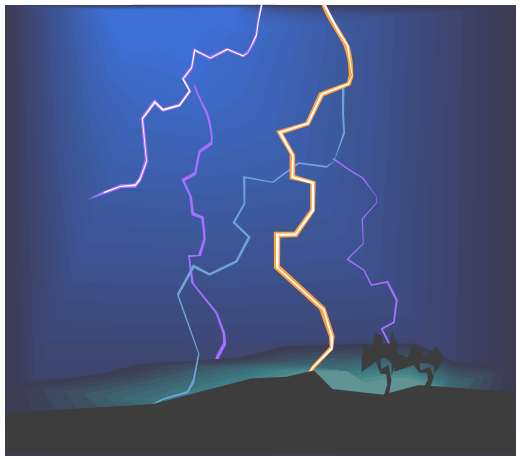
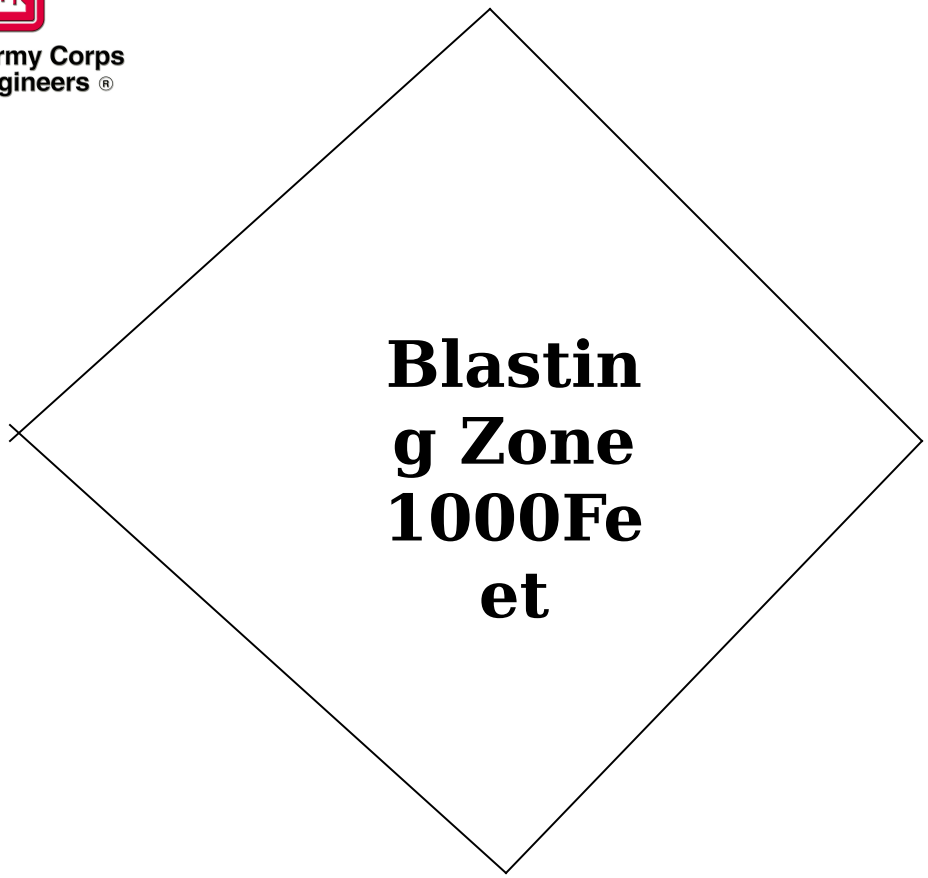
1926.900 General provisions

- Suspend operations & remove personnel at the approach of an electric storm
- Warning signs: no radio transmitters w/in 1000 ft, if R.T's used competent person documents
- Ensure mobile transmitters ≤ 100 ft are off & locked





About 48” x 48”

Turn Off Two Way Radio

About 42” x 36”

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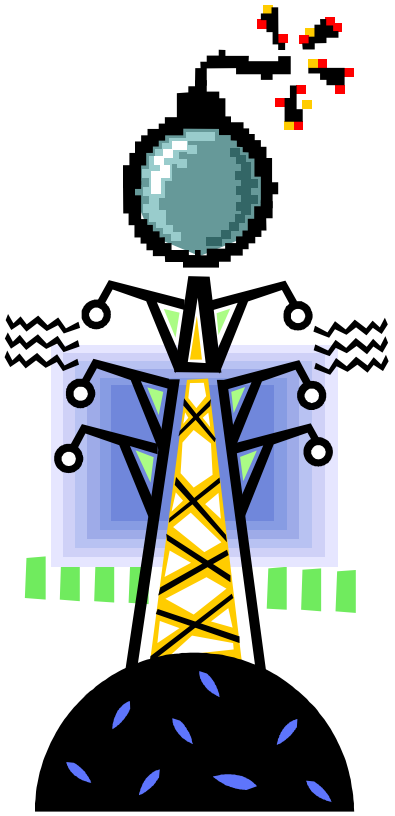
1926.900 General provisions

- Do not use deteriorated or damaged explosives
- Notify utility & take precautions if blasting near power lines
- **<u>Use of Black Powder is prohibited</u>**



1926.900 General provisions

- Buildings non-combustible, or sheet metal on wood studs
- Floors in mixing plant concrete or non-adsorbent
- Fuel oil storage separate & drain away
- Mixing plant must be well ventilated
- Direct sources of heat from outside building only

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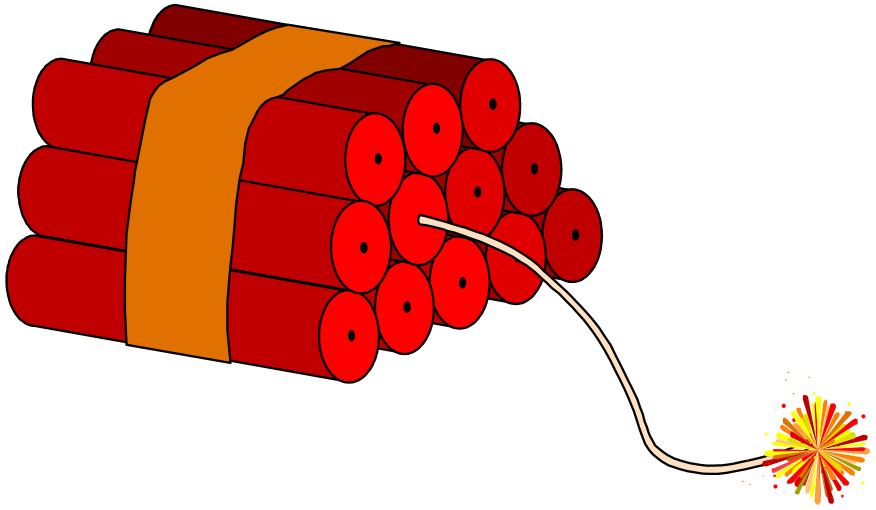
Blaster Qualificatons



1926.901

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Blaster qualifications

- Can understand & give written and oral orders
- In good physical condition & not an addict
- Qualified by knowledge, training experience in transporting, handling, use of explosives & laws
- Blasters furnish evidence of competency
- Knowledge and competent in each type of blasting used

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1926.902 Surface transportation of explosives

- Meet DOT 46CFR 146-149 & listed regulations
- Driver is fit and knows laws for transporting
- No smoking, no matches, or ammo in vehicle
- No other items transported
- Blasting caps & explosives travel separately
- Strong good vehicles only
- Securely mounted on cargo bed

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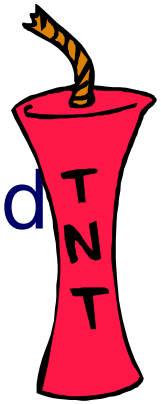
1926.905 Loading explosives

- Establish safe procedures before starting
- Drill holes large enough for free insertion
- Tamping only with wood rods or plastic rods
- **Never** tamp primer
- Load only holes to be fired in next round
- No drilling until butts of old holes are examined
- Shall not deepen holes that have contained Exp.
- No unattended explosives at blasting site



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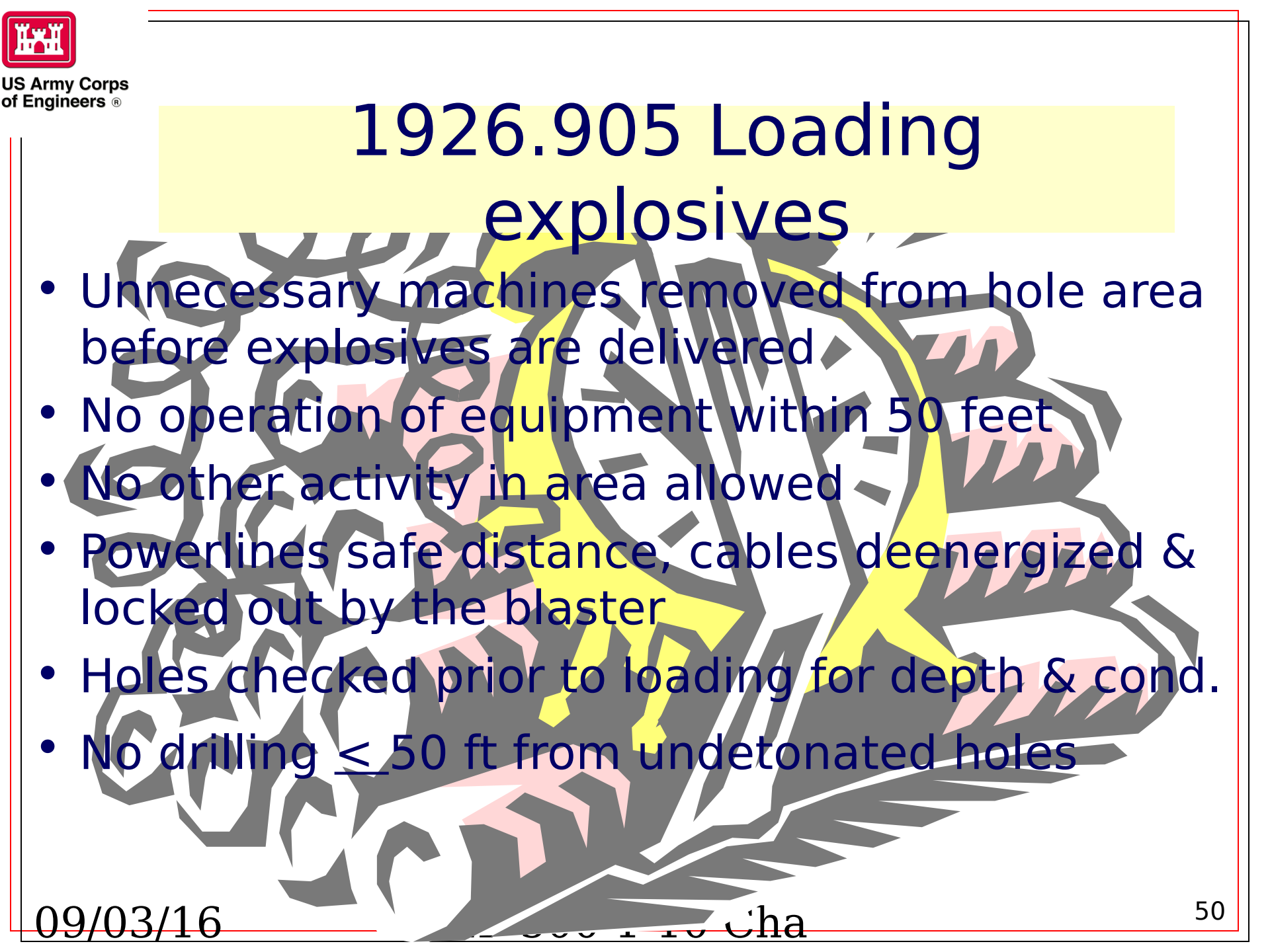
1926.905 Loading explosives



- Unnecessary machines removed from hole area before explosives are delivered
- No operation of equipment within 50 feet
- No other activity in area allowed
- Powerlines safe distance, cables deenergized & locked out by the blaster
- Holes checked prior to loading for depth & cond.
- No drilling ≤ 50 ft from undetonated holes

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1926.906 Initiation of explosive charges-electric blasting

- No initiation of E.B. where extraneous electricity
- B.C. leg wires shunted till connected for blast
- Blaster must conduct survey for E.E. & eliminate
- Single E.B. all caps same style & manufacture
- All E.B. blasting, follow mnfr's recommendations

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1926.906 Initiation of explosive charges-electric blasting

- Keep blasting wires too short to hit power lines or anchor
- Only t/ man making lead wires fires the shot
- Immediately after firing, wires are disconnected from the machine and shunted

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- 1926.907 Use of safety fuse
- 1926.908 Use of detonating cord
- 1926.909 Firing the blast
- 1926.910 Inspection after blasting
- 1926.911 Misfires
- 1926.912 Underwater blasting
- 1926.913 Blasting in excavation work under compressed air
- 1926.914 Definitions

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